NUTRITION, A NATIONAL PROBLEM

by

Ouida Davis Abbott

Address given at Joint Meeting of Florida Agricultural Extension Workers and Florida State Agricultural Land Use Planning Committee, Gainesville, Florida, October 17, 1940

The success or failure of any defense program depends to a great extent not only on the men in the army and navy, but upon the much larger group behind the lines; the men and women who produce the food and operate the factories, the women who must bear the children and the children who must solve the problems created by us. Are all these groups strong and vigorous, and if it becomes necessary to lower the standards of living are they so free from disease that they can go on living and working? How then does the man power of the United States compare with the mechanized power? In the London area the proportion of men rejected as physically unfit for service has been since the war as high as 82 percent; these figures were considered typical for the whole country. General Sir Wilfred Beveridge stated that the chief cause of the men's rejection was malnutrition during childhood. Are we in the U. S. in the same condition?

A partial answer to this was given in a recent issue of the New York Times. Here it was pointed out that, of the men volumteering for service, one out of two of the city boys and one out of every three of the rural boys were able to pass the physical examination. The most prevalent defects were defective teeth, eyes, underheighth, and under and over weight. As these defects are usually attributed to faulty nutrition, if we know what Americans are eating, we would know whether they are physically fit. Therefore the question of the moment is, "Do Americans have an adequate diet." But before we can go far into answering the question the term adequate diet must be defined and standard measures set up.

Surely a diet is adequate when it contains the foods which supply both quantitatively and qualitatively the nutrients necessary for the body's needs.

But what constitutes an adequate diet or what foods must be included in the diet for a man to be well nourished is a matter involving many factors. Nutritionists do not always agree on either the quantity or quality of nutrients considered essential for optimum nutrition. Controversies rage over this and that mineral salt; the many fractions of the various vitamins, both known and unknown; the proteins, fats, carbohydrates as well as a thousand or more intricate aspects of gland function and metabolism. However, there is considerable agreement on basic principles and because of this it has been possible to set up dietary standards.

It is understood of course that these standards are subject to change but the leading nutritionists of the country appear to be willing to make diet recommendations and set up standards.

Dr. McCollum of Johns Hopkins suggests the equivalent of a quart of milk throughout life; a liberal serving of pot herbs daily and the equivalent of two salads containing fresh fruits or raw vegetables every day. Dr. McCollum then adds, "If you eat these foods you can eat what you like to make up the rest of the food needs." In other words as McCollum has phrased it, "Eat what you want after you have eaten what you should."

In very simple terms Dr. Sherman has summarized man's food needs. (1) Let at least half of the needed food calories be taken from the protective foods--milk and its products, fruits, vegetables and eggs. (2) Of whatever breadstuffs and other cereals or grain products are eaten, let at least one-half be in the "whole grain" of dark or unskinned forms.

The people of the U. S. spend approximately 15 billion dollars a year for food. But in spite of this great outlay of money and the fact that during the past twenty-five years much has been learned about food and nutrition, preliminary estimates made by the Bureau of Home Economics and Labor statistics co-operating show that a large part of the population is inadequately fed and diseases of nutritional origin are prevalent. Among city and village families, one out of every 10 had a good diet; less than 4 out of every 10 had a passable diet; more than 5 out of every 10 had a poor diet. These estimates were made on the U. S. as a whole.

Now what can be said of the nutrition of the South and especially of Florida? Approximately 28 percent of the population of the U. S. live in the States classed as Southern and of this group 35 percent of them are less than 15 years of age. Moreover, in their search for jobs the productive middle age groups leave the South in greatest numbers. This exodus tends to make this the land of the very old and the very young. In the cotton belt 15% of the relief families are without a male over 16 years of age. One community had 30% of the households headed by women. It is evident that poverty and ignorance are two factors of major importance.

In order to evaluate the nutritive status of the rural South it would be well to know (1) What kind of diets do the people of the rural South actually consume and (2) What is the average state of nutrition of individuals belonging to the various social strata. But the answers are, however, except to a very limited extent, obviously unknown and difficult to obtain.

Data which contribute some information to the answers of one or the other of these questions have been collected in all the Southern States. Now let us consider the available data on question one. What kind of diets do the people of the South actually consume?

Analysis of the data show that as a whole, the people of the South are a long way from being well nourished according to the latest nutritional standards. Surveys made of the farm's contribution to family living show that approximately 70 percent of the foods of rural people in the general farming section are home-grown. Foods that can be abundantly and easily grown make up the principle food items. Data collected from several States show that sweetpotatoes, corn and its products, rice, cowpeas, and pork are among the main articles of diet; while the protective foods such as milk, eggs, leafy vegetables, fruit were far below the nutritive needs. Eggs, though produced on nearly all the farms, were used sparingly in most homes.

Calculations from information given out by the Milk Industry Foundation for 1938 shows that while the South has 35% of the children of the U. S., it has only 18% of the total milk supply. That means that the South is far below dietary standards in milk. The same can be said of fruit.

What is the average state of nutrition of individuals belonging to the various social strata? For relative standing in health Odom ranks all the Southern states in the 3rd or 4th quartile. The South's relative standing in health is, of course, adversely affected by the large number of Negro and tenand farmers, but these are an integral part of the South and cannot be excluded from consideration. Through data gathered in several of the Southern states on the nutritional status of rural women and children and college students in various social and economic strata the prevalence of nutritional diseases has been established. The outstanding diseases were anemia, avitaminosis, A, B, and C, pellagra and general malnutrition brought on by multiple dietary deficiencies, and increased by malaria and hookworm.

In Florida we have much the same situation.

During the past 12 years a study has been made by the Department of Home Economics Research of food habits and dietary deficiency diseases occuring among the people of rural Florida. At the present 10,000 subjects have been examined and of these more than three-fourths were rural school children living in the north central part of the State.

It was found that the people of these counties could be divided into three rather distinct groups according to food source and habit. First, those families producing 70 percent of their food, which was fairly adequate both as to quantity and iron; (2) those producing enough food, but low in iron and perhaps in other essential elements and (3) those producing food inadequate both in quantity and quality and who, because of economic conditions, ignorance and habit were subsisting on diets below the physiological danger line.

Dietary studies were made on children from 3000 farm families. The diets as a whole were very poor. None of the children had food that provided a wide margin of safety. About 25 percent had diets rated as fair - not good but passable. These were above the danger line but possibly were not far enough.

The remainder of the group about 75 percent, had diets deficient in one or more nutrients and were below the physiological danger line, according to the most conservative standards. Among the entire group, milk was used in only 28 percent of the families' menus, butter and eggs in 30 percent, leafy vegetables 27 percent, and fruit in only 20 percent. The cereals were represented almost entirely by grits, corn meal, white flour and rice. The food items occurring most often were rice, grits, corn meal, sirup, white bacon and biscuit. The year round garden was rarely found and outside the citrus section, fruit was scarce and limited to summer when wild berries and a few peaches and figs were available.

The data collected indicated that these diets were affecting the health of the people. Approximately 33 percent of the children had some degree of conjunctivitis. This type of conjunctivitis was diagnosed by blood studies and further clinical examinations as a manifestation of a deficiency of vitamin A. In this connection it might be well to recall that green vegetables and butter were used very sparingly in the diets of many of the children.

Carious teeth were found in about 45 percent of the subjects. In many cases the incisors were carious and the 6-year molars were decayed before the 12-years molars erupted. A more or less cursory examination was made of the teeth of mothers and expectant mothers. The entire absence of teeth, the absence of front teeth, the absence of molars, the presence of many carious teeth and malocclusions all gave evidence of poor teeth structure, due for the most part to inadequate diets - perhaps inadequate calcium and phosphorus. It was found that 33 percent of the children using milk had teeth that were not defective, while little more than 10 percent of those not using milk had good teeth

Another defect that apparently bore some relation to diet was abnormal height-age relations. It was found that the 8-year old girl was 2-1/2 inches shorter than the standard given by Holt; the 13-year old girl was 3 inches shorter than the standard of either authority. Similar observations were made on the boys. The 16-year old boy was 3 inches under height by the standard of Rose and 3 inches by the standard of Holt.

Enlarged and diseased tonsils were found in approximately 40 percent of the children who had not had tonsillectomy.

But of all the defects found in these subjects, anemia was the most prevalent. Moreover, wide variations in the percentage of anemia were found in the children of the different counties and in different sections of the same county. All these children attending school were considered able to participate in the

daily program. The data show that 53 percent of them were anemic, that is hemoglobin below 13.6 grams; approxiamtely 10 percent had values between 3.6 and 8.2 grams; and only 23 percent had normal values. There was considerable variation in the percentage of anemia in the children of the different counties. County 3 had 28 percent anemia, while the other counties had 63, 58, 46, 62, 60, 42, and 42 percent respectively. In county one there were four times as many children in the lowest hemoglobin group as in the highest; in county two, five times as many; and in county three six times as many. A study was then made of several factors which may be causing this condition.

Hookworm infection is a factor which in the past has been held to account for the high incidence of anemia in the South. From the data collected, this infection could not account for the observed variations. Hookworm was widespread and should have contributed more or less uniformly to the occurrence of anemia; yet in certain schools where a large number of children were infected there was no more anemia than in schools where a lower percentage of infections occurred. It was found also that many children with hemoglobin values between 21 and 50 percent were negative to hookworm.

It was observed that often the removal of the worm burden did not cause an improvement in hemoglobin, but on the other hand if iron were given to hookworm infected children the hemoglobin was restored to normal values without the removal of the parasites. Investigations on the degree of hookworm infection showed that many of the children were infected with a moderate number of parasites It was found that a well nourished child thus parasitized had little change in hemoglobin; however, when a poorly pourished one had the same number of worms the hemoglobin reached dangerously low levels. Apparently most of the general symptoms considered indicative of hookworm infection were due to anemia, for when iron was given the pallor, the marked weakness, the excessive fatigue, loss of appetite, and edema gradually disappeared.

The fact that the welfare of livestock of any particular region was limited by the fertility of pasture soils has been recognized for many years. At the Florida Agricultural Experiment Station it was demonstrated that the age-old disease of cattle known locally as "salt-sick" was a nutritional disease occurring when the food was restricted to native forages grown on certain white and gray sands and residual mucks. Inadequate quantities of iron, copper, cobalt or combinations of those and perhaps other elements were found to be the underlying cause of the disease. Supplemental salt mixtures containing these elements raised the hemoglobin and increased growth and reproduction. There was a possibility that people living on these deficient soils and producing much of their food theron would suffer from the same deficiencies. In former investigations it was noted that the incidence of anemia was usually highest in the schools where the predominant soils of the districts were classed as deficient in regard to salt sick of cattle.

It was found that in those districts where the predominant soils were classed as deficient in regard to salt-sick of cattle from 52 to 96 percent of the children were anemic, but in the districts where the predominant soils were balanced and classed as protected in regard to salt-sick, from 0 to 23 percent were anemic.

The iron content of vegetables grown in the home gardens in the districts was then determined. Turnip greens were selected as the index food. Analyses showed that the iron in these greens varied from 268 p.p.m. when grown on the protected soils to 56 p.p.m. when grown on the deficient ones. Through cooperation with the horticulturists of the several substations, turnip greens from a uniform seed source were grown at four diverse points in the State. The fertilizer practices of each section were used, but all plantings and cultural practices were the same. The average iron in these greens varied from 84 p.p.m. to 238 p.p.m. Mustard greens varied likewise. It must be borne in mind that none of the soils whereon these greens were grown was considered deficient, yet as shown there was a considerable variation in iron.

That the anemic condition of the children was due to mineral deficiency was demonstrated by treating 400 anemic children with 100 mgs Fe as ferric ammonium citrate three times a day. Within 4 to 6 weeks after beginning treatment all the subjects showed improvement and all except the ones with very low hemoglobin had values within the normal range.

Because of the imporvement in hemoglobin with the administration of iron salts, it is not to be assumed that iron was the only element involved. The ferric ammonium citrate was in the form of U.S.P. grees scales and had copper, manganese, and cobalt as impurities. However, with the regeneration and restoration of hemoglobin there was a tremendous improvement in color, activity and appetite.

It should be made clear that deficient soils and mineral deficiency diseases are not localized in small areas in Florida, neither are they confined to Florida. Deficient soils and mineral deficiency diseases of cattle have been identified in Nova Scotia, Massachusetts, North and South Carolina, Georgia, and Florida. Anemia of children is so widespread that it has often been called the ubiquitous nutritional disease.

In addition to the mineral deficiencies already noted, areas deficient in manganese, calcium, phosphorus, copper and zinc have been identified. The effects of a lack of these elements on plants growing in those areas is well recognized, but the effects of a lack of some of these elements on animal nutrition are not known; neither is it known what effect slight deficiencies of these elements will have when extended over a long period.

From this work it seems evident that while hookworm infection undoubtedly affects the degree of anemia, the high incidence in rural children is due primarily to diets low in iron. These low iron diets are occasioned not only by low incomes, ignorance of food values, habit, inertia, but as shown in this study, by variation in home grown foods. It appears then that soil deficiency

operating through the plants grown thereon and ultimately on the health of the people is a factor that should be considered in any section where nutritional anemia is endemic.

A study was then made of foods actually eaten by farm families. In one county there were 240 farm families. It was considered that food samples collected from 80 of them could be representative of the group. It was found that in the amounts eaten the iron in the food samples (an aliquot of all foods used in six consecutive meals by a child) varied widely. Children having diets below the physiological danger line had from 1.2 to 4 mg iron daily; those having the major part of their food produced on soils classed as marginal or dificient in regard to salt sick of cattle had from 3 to 6 mgs., those whose food was produced on the better soils and was fairly adequate both as to quantity and quality had from 6 to 10 mgs. The diets were likewise low in calcium. This was due no doubt to the low consumption of milk as only 14 percent of the families were using fluid milk and 4 percent used evaporated milk. When milk was not used the dietary calcium varied from 112 mg to 240 mgs. According to the 1930 census there were 1,606,000 people in the State and 133,000,000 quarts of milk were produced yearly. If everyone in the State were given a quart of milk a day the supply would last only 82 days, if a pint, 164 days and if a half pint, the least amount that Streibling puts in the lowest cost protective diet for adults, there would still be days when the entire state would be without milk. It is true, of course, that considerable evaporated milk, some dry milk and ice cream are used, but evaporated milk is used principally in infant feeding and in seasoning, very little is used as a beverage, while ice cream is still considered a luxury.

Several months ago in making recommendations for the food supply for humans and livestock in the State it was brought out that in estimating the amount of corn necessary to keep a horse or cow, double the necessary amount must be raised because the weevil ate half. In this connection I should say in planning the food supply for Florida children that after giving the child what is considered an adequate diet, enough more should be allowed to take care of the hookworm.

An experiment to show the effect of an improved diet on the health of children and their advance in school is now in progress. This work has been made possible through contributions from the Dry Milk Association and certain State agencies. It was found that 85 percent of the 200 children in the school have gross physical defects, anemia, caries, vitamin deficiencies, under weight, hookworm and general malnutrition brought on by multiple deficiencies. Data from the Superintendent of Public Instruction show that 51 percent of the children in the county fail to finish the seven grades. About one-fifth of those

entering the first grade graduate from High School. The cost of rearing children on diets now know to be definitely harmful to their mental and physical development means that America has a group unable to cope with the problems of the times and has thus become a burden on society. Of late it has been said that the South is the Nation's number one economic problem, but I say that unless something is done we will be not only a grave economic problem but its greatest social and health problem.

"In the past," says Dr. McLester in his presidential address before A.M.A. "Science has conferred on those people who availed themselves of the newer knowledge of infectious deseases better health and a greater average length of life. In the future it promises to those races who will take advantage of the newer knowledge of nutrition a larger stature, greater vigor, increased longevity and a higher level of cultural attainment. To a measurable degree, man is now master of his own destiny where once he was subject only to the grim hand of Fate

From the data presented would you conclude that the children of the South are masters of their own destiny?

Duplicated in Southern Division, AAA
December 6, 1941